

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

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Applicant's or agent's file reference PL 156 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/FI2004/000425	International filing date (<i>day/month/year</i>) 02.07.2004	Priority date (<i>day/month/year</i>) 10.07.2003
International Patent Classification (IPC) or both national classification and IPC G06F17/30, H04M15/00		
Applicant COMPTEL CORPORATION et al		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	<p>This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 5 sheets.</p>
3.	<p>This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(II) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 10.05.2005	Date of completion of this report 30.06.2005
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Kahl, M Telephone No. +49 89 2399-7586



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/FI2004/000425

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-31 as originally filed

Claims, Numbers

1-31 received on 10.05.2005 with letter of 10.05.2005

Drawings, Sheets

1/11-11/11 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☒ the claims, Nos.: 32
☐ the drawings, sheets:

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5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:

see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16, 18-31
	No: Claims	17
Inventive step (IS)	Yes: Claims	
	No: Claims	1-31
Industrial applicability (IA)	Yes: Claims	1-31
	No: Claims	

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2. Citations and explanations

see separate sheet

SECTION IV

1. The amendments only are effected for claim 1, directed to a method of classification applying **at least two** specified fields. Thus claim 17, directed to a classification system including a field-specific classification structure according to **at least one** field is no longer considered as the corresponding claim directed to a classification system.

SECTION V

1. The following document is referred to in this communication.

D1: US-A-6 055 539

2. In the description no support can be found for the term "assigning the selected class ...)" or "assigned class".

Therefore the requirements of Article 34 (2) (b) PCT and Rule 19 (2) (b) PCT are not met.

The feature steps of assigning a class used in amended claim 1 thus are ignored.

- 3.1 Document D1 discloses (see in particular the abstract; column 2, lines 2 to 4, 5 to 9, 45 to 47 and lines 52 to 54; column 3, lines 6 to 8; column 3, lines 35 to 67; fig. 13 to 17a) a method for setting up a classification structure for the classification of records, based upon several attributes, and further discloses (see column 2, lines 45 to 47) prior art documentation on parallel classification of very large data bases.

Thus all the steps of present amended claim 1, directed to the classification of data using at least two fields of a record by selecting field-specifically ordered classification structures for each of the specified fields, followed by an intersection of the set of suitable classes, are considered as obvious steps for a parallel classification of records and thus implied by D1.

The subject-matter of amended claim 1 therefore does not involve an inventive step (Article 33 (3) PCT).

- 3.2 Document D1 discloses (see in particular the abstract; column 2, lines 4 to 9 and lines 20 to 26; column 3, lines 6 to 8 and lines 13 to 18; fig. 4 to 6 and 13 to 17a) according to the essential features of present **independent claim 17** a classification system for records, which is arranged
- to receive records, containing fields with values (column 3, lines 6 to 8),
 - the classification structure contains a field-specific classification structure according to at least one specified field (column 2, line 4: "classifying attribute"; column 3, line 7: " class label"; fig. 2) of the received record
 - logical operands (implied by "decision tree ..., easy ... to be converted to classification rules or to... SQL statements" column 2, lines 20 to 26) are connected to the field-specific classification structure
 - the reference values used in the class definition are arranged to form a separately ordered structure (fig. 6, sorted for "Age" reference and for "Record ID" reference; also implied by fig. 4 to 5 and 13 to 17a;)
 - the classification system is set to assign the class of a received record (in general: column 2, lines 5 to 9)

The subject-matter of present **claim 17** therefore is not **novel, Article 33(2) PCT**).

- 3.3 The subject-matter of **independent claim 31** reflects subject-matter which is termed as a computer program product, according to the subject-matter of independent claims 1 and 17.

However, the method of claim is directed to a classifying method using **at least two** specified fields of a record, whereas claim 17 is directed to a system supporting field-specific classification structures of **at least one** field.

Claim 31 thus is not clear (Article 6 PCT).

However, a computer program product is implicitly disclosed by the nature of data mining, so that any claim directed to a computer program product according to the

method of claim 1 or the system of claim 17 does not involve an inventive step (Article 33(3) PCT) for the same reasons as mentioned for the claims to which it relates.

4. Furthermore, **dependent claims 2 to 16 and 18 to 30** do not appear to contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step (**Article 33 (3) PCT**) for the reason that the subject-matter of said claims is either in principle derivable from the disclosure of document **D1** (for **claim 2**: set or sub-set; see column 3, lines 45 to 50; for **claims 5 and 13**: binary-, tree- and hash search: see column 3, line 60; column 5, line 55; column 12, line 17; for **claims 8, 21, 23 and 29**: numeric or categorial attributes: see column 1, line 67 to column 2, line 4; for **claim 19**: operand specific ordered data structure: see fig. 6 or fig. 4 to 5, 13 to 16; for **claim 20**: implied by classification according to classification/classifier: see column 2, lines 20 to 23, column 3, lines 13 to 18), or it represents minor design details (for **claims 3 and 14**: choosing classification with highest number of classification conditions met is obvious, also implied by a decision tree; for **claim 4**: logic operands implied by decision tree; for **claims 6, 9, 10, 11, 12, 17, 27 and 30**: apply classification structure to determining call charges in telecommunication networks (GSM, GPRS, UMTS) with complex tariff structures for time and volume oriented charging; for **claims 7, 24 and 28**: marking fields with "field id" is generally known in telecommunication networks, e.g. applying ASN.1 coding of records, introducing a field tag; for **claim 15**: obvious approach, if an intersection of classes is empty; for **claim 16**: the use of mediators for any type of data adapting is commonly known; for **claim 18**: obvious, that class definition is recorded, so that a classification of records according to these conditions can be made; for **claims 22 and 25**: sorting of reference values according to magnitude is an obvious measure; for **claim 26**: obvious task of classification) which are generally known to the person skilled in the field of data mining, complex data bases and charging in the telecommunication environment.

The subject-matter of **dependent claims 2 to 16 and 18 to 30** therefore is not inventive (**Article 33(3) PCT**).

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SECTION VII

1. Document **D1** is not identified in the description and its relevant contents is not indicated (**Rule 5.1(a)(ii) PCT**).

Claims:

1. A method for classifying and selecting records, comprising

- 5 — receiving records containing several fields, the fields of which records contain values,
- reading (1002) the values contained in at least two specified fields from each of the received records,
- 10 — selecting (1001) field-specifically ordered classification structures corresponding to the specified fields, which field-specifically ordered classification structures comprise an own ordered classification structure for each of the specified fields in the received record,
- for each record:
 - 15 — searching (1001, 1004, 1007) from the selected classification structures a set of suitable classes for each of the specified fields, wherein the suitable classes correspond to the value read from the field, and
 - forming an intersection set of the sets of suitable classes,
- selecting a class from the intersection set and assigning (1112) the selected class to the record, whereby said assigned class has been read from the field-specifically ordered classification structure.

2. A method according to Claim 1, characterized in that

- 20 — sets are formed on the basis of the values of the fields, in such a way that a set of classes is formed for each field,
- 25 — the service IDs, the condition of the field used in the conditional statement of the class of which is true, are incorporated in the field-specific sets, and
- the class that appears in all of the sets, i.e. whose conditional statement is entirely true, is selected (1111).

3. A method according to Claim 1 or 2, characterized in that the accuracy principle is used to select the class, to which the record is selected, from the classes corresponding to the reference value or reference values, in which case that is selected, from of those corresponding to the reference value or reference values, which has the definition of

which the greatest number of classification structure conditions are met.

- 4. A method according to any of Claims 1 - 3, characterized in that the class to which the record is selected is selected, from the classes corresponding to the reference value or reference values, by applying an intersection or intersections and unions performed using logical operands.
- 5
- 5. A method according to any of Claims 1 - 4, characterized in that the reference value is searched from a field-specific classification structure, by using a search method that is faster than a sequential search, such as a binary search, a tree search, a hash search, and that the least comparisons are used to find the reference value according to the value contained in the field is found in an ordered structure in the classification structure.
- 10
- 6. A method according to any of Claims 1 - 5, characterized in that the records received are formed on the basis of the properties of the telecommunications connections.
- 15
- 7. A method according to any of Claims 1 - 6, characterized in that the fields are fields marked with a field ID.
- 20
- 8. A method according to any of Claims 1 - 7, characterized in that values in various formats, such as numeric and symbolic values are placed in the fields, and that there are specific classification structures for the various formats, and/or indicators to the classification structures.
- 25
- 9. A method according to any of Claims 1 - 8, characterized in that the classes to which the records are selected are service classes of billable telecommunications services, or a call, and/or types of telecommunications connections.
- 30
- 10. A method according to any of Claims 1 - 9, characterized in that the classes, to which the records are selected, are separated on the basis of conditions relating to the properties of telecommunications connections.
- 11. A method according to any of Claims 1 - 10, characterized in that one field

identifier corresponds to a field depicting the duration in time of a billable telecommunications connection and/or a field depicting the volume and/or speed of the data transmitted over a billable telecommunications connection.

- 5 12. A method according to any of Claims 1 - 11, characterized in that the record is a telecommunications network event description record, such as a CDR, ER, IPDR, or UDR.
- 10 13. A method according to any of Claims 1 - 12, characterized in that the names of the fields are set to form the entries of the table and for each field at least one operand-specific table according to at least one of the following operands is created, greater than (>), greater than or equal to (>=), less than <, less than or equal to (<=), equal to (=), and not equal to (!=) tables, so that a tree-like field-specific classification structure is created for each specified field.
- 15 14. A method according to Claim 1, characterized in that the intersection set includes more than one class and, of these classes, the class with the greatest accuracy is selected, which accuracy is defined on the basis of the number of fields used in the conditional statement of the class.
- 20 15. A method according to Claim 1, characterized in that the intersection set is an empty set and the class is selected in such a way that a review is made of the statement with next lowest accuracy.
- 25 16. A method according to any of Claims 1 - 15, characterized in that it is performed in a mediator system of a telecommunications network.
17. A classification system for records, which includes a classification system that is arranged
- 30 - to receive records, the fields of which contain values, and
- to select the records to classes
- characterized in that
- the classification structure contains a field-specific classification structure

according to at least one specified field of the received records,

- logical operands are connected to the field-specific classification structure,
- the reference values used in the service-class definition suiting each operand relating to each defined field are arranged to form a separately ordered structure,
- 5 - classes suiting each reference value are connected to each ordered structure,

and

- the classification system is set to select, to a set class, the classification of a received record.

10 18. A classification system according to Claim 17, characterized in that the conditions of the classes are recorded in the classification structure.

15 19. A classification system according to Claim 17 or 18, characterized in that at least one reference value and at least one service ID according to the reference value are recorded in an operand-specific ordered data structure.

20 20. A classification system according to Claim 17 - 19, characterized in that the field-specifically ordered classification system contains a selection structure based on operands and a class division corresponding to the selections according to the structure.

21. A classification system according to any of Claims 17 - 20, characterized in that the classification system contains format-specific classification structures, or format-specific indicators to the classification structures.

25 22. A classification system according to any of Claims 17 - 21, characterized in that the reference values in the field-specific classification structure are arranged as an ordered structure essentially in order of magnitude.

30 23. A classification system according to any of Claims 17 - 22, characterized in that the classification structures are separate, on the basis of the form of the symbol used in the classification structure field, such as character-form or numeric.

24. A classification system according to any of Claims 17 - 23, characterized in that the

field identifier is arranged to correspond to the field depicting the data-transfer capacity of a billable telecommunications connection.

5 25. A classification system according to any of Claims 17 - 24, characterized in that the reference values are listed in order of magnitude and/or accuracy.

10 26. A classification system according to any of Claims 17 - 25, characterized in that it is arranged to search from the classification structure for the service class set for a received record, according to the method according to any of Claims 1 - 16.

27. A classification system according to any of Claims 17 - 26, characterized in that it is arranged to operate in a mediator system of a telecommunications network.

15 28. A classification system according to any of Claims 17 - 27, characterized in that the fields are fields marked using a field identifier.

20 29. A classification system according to any of Claims 17 - 28, characterized in that values with different formats, such as numeric and symbolic values, are set in the fields and there are specific classifications structures and/or indicators to classification structures for the different formats.

25 30. A classification system according to any of Claims 17 - 29, characterized in that at least one field identifier corresponds to a field depicting the duration in time of a billable telecommunications connection and/or a field depicting the volume and/or rate of data transmitted on a billable telecommunications connection.

31. A computer program product for classifying records, characterized in that it is arranged to perform a method according to any of Claims 1 - 16 and that it includes a classification structure according to any of Claims 17 - 30.